

Figure 1 Potential crown ethers that can be used to make ionic liquids.

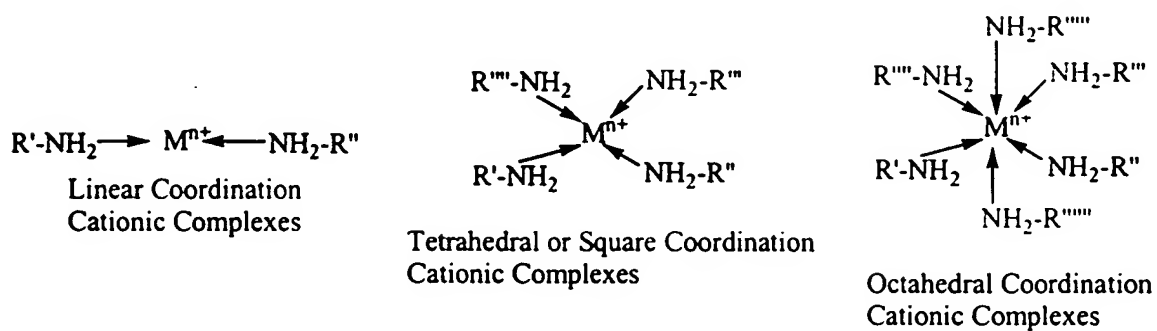


Figure 2 Structural features of the cations in new ionic liquids made by the complexation reactions of neutral amine ligands with metal ions.

Fig 3

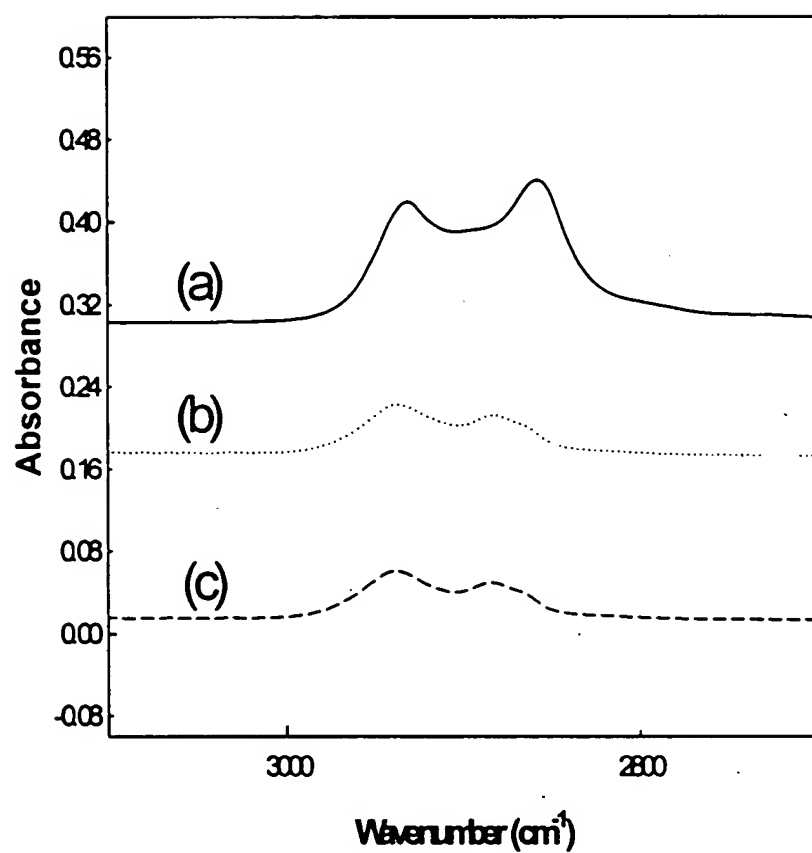


Figure Comparison of FTIR spectra of (a) pure cyclohexo-15-crown-5 and RTILs prepared with the mole ratios of cyclohexo-15-crown-5 to LiTf_2N = (b) 1:1 and (c) 1:1.35, respectively.

Fig. 7.

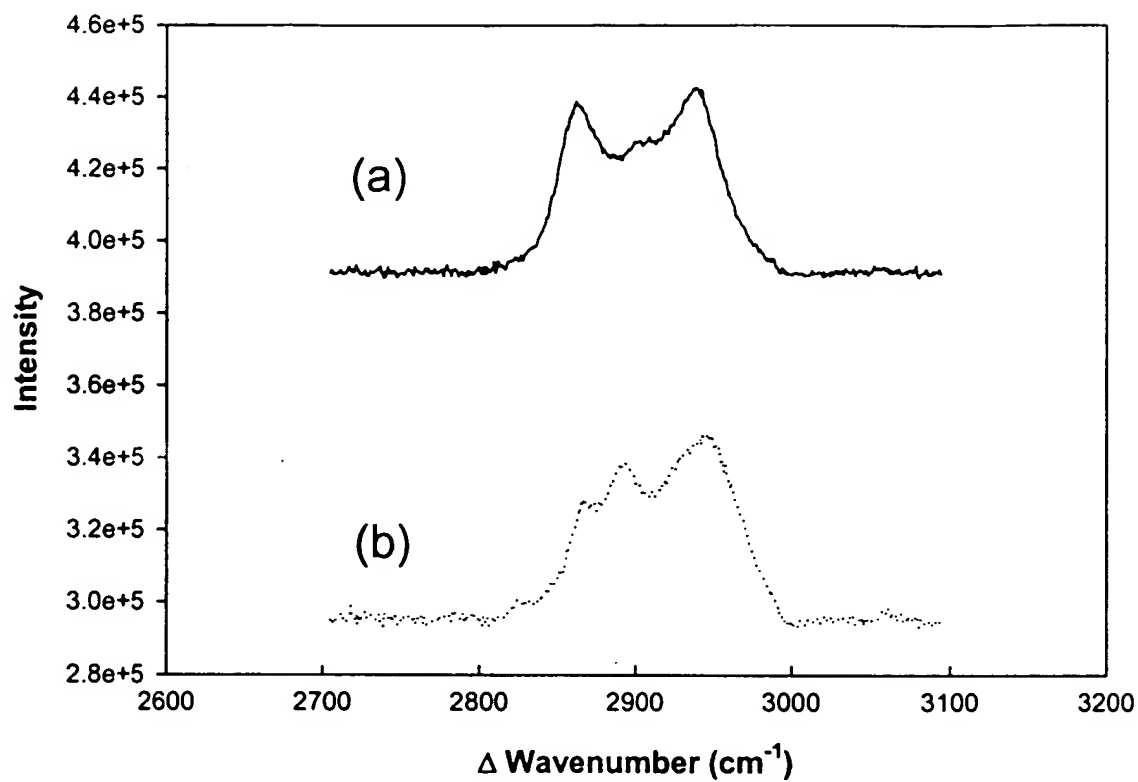


Figure. S1 Raman spectra of (a) pure cyclohexo-15-crown-5 and (b) RTIL prepared with the mole ratio of cyclohexo-15-crown-5 to $\text{LiTf}_2\text{N} = 1:1$ in C-H stretching region.

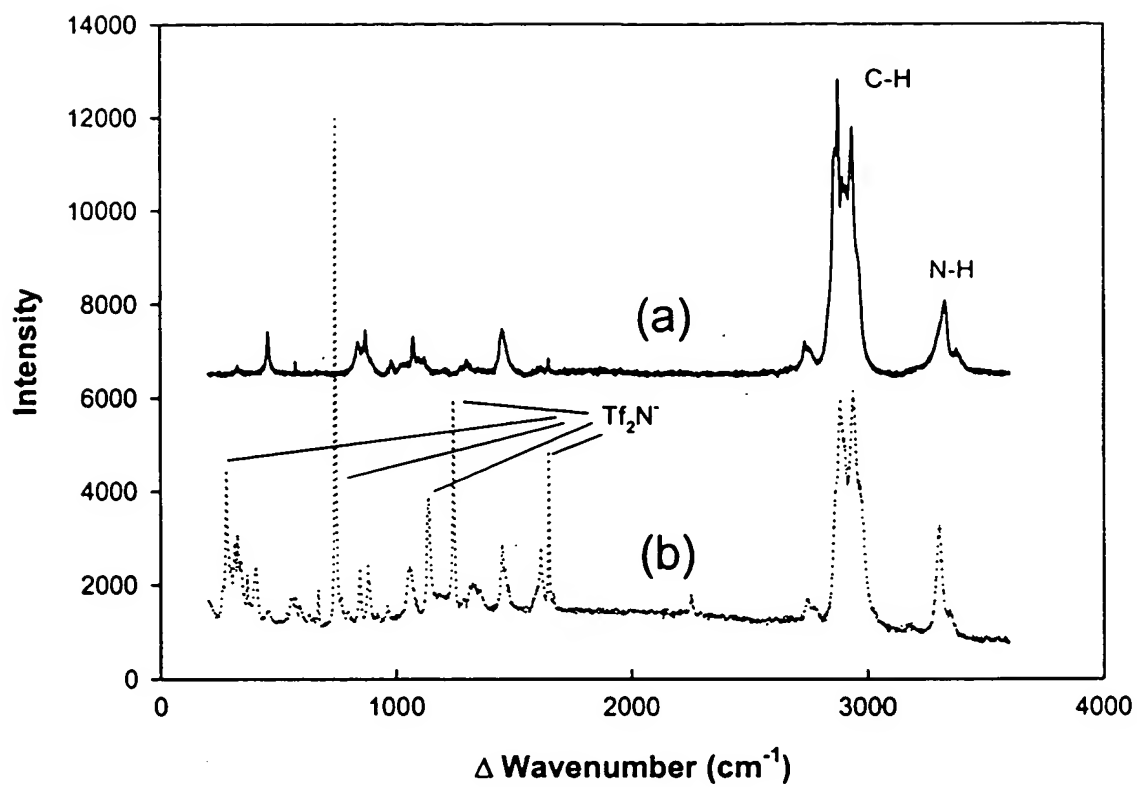


Figure 2S. Raman spectra of (a) propylamine and (b) $\text{Ag}(\text{H}_2\text{N}-\text{C}_3\text{H}_7)_2^+ \text{Tf}_2\text{N}^-$ RTIL.

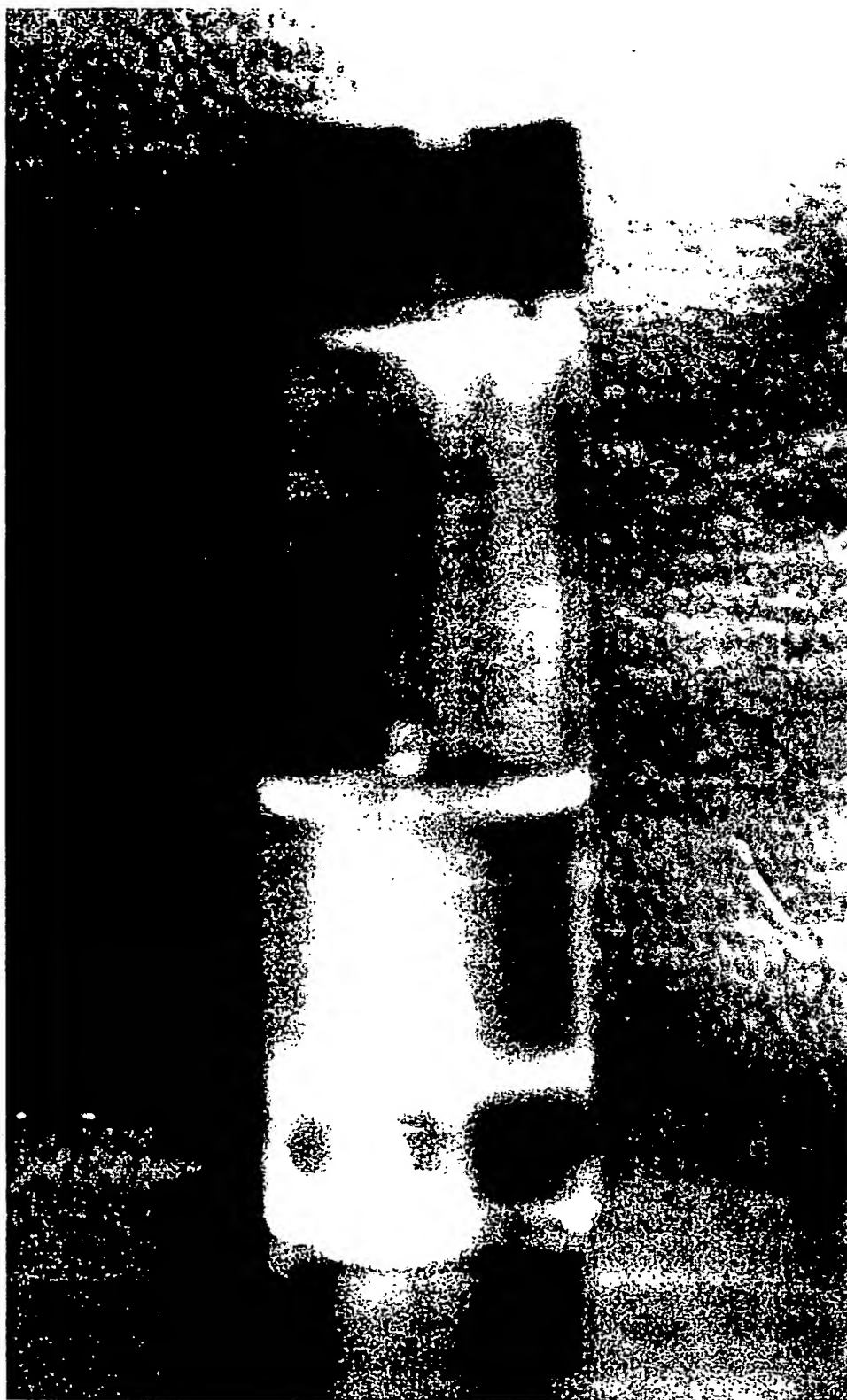
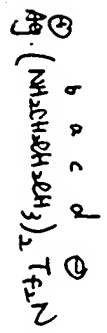


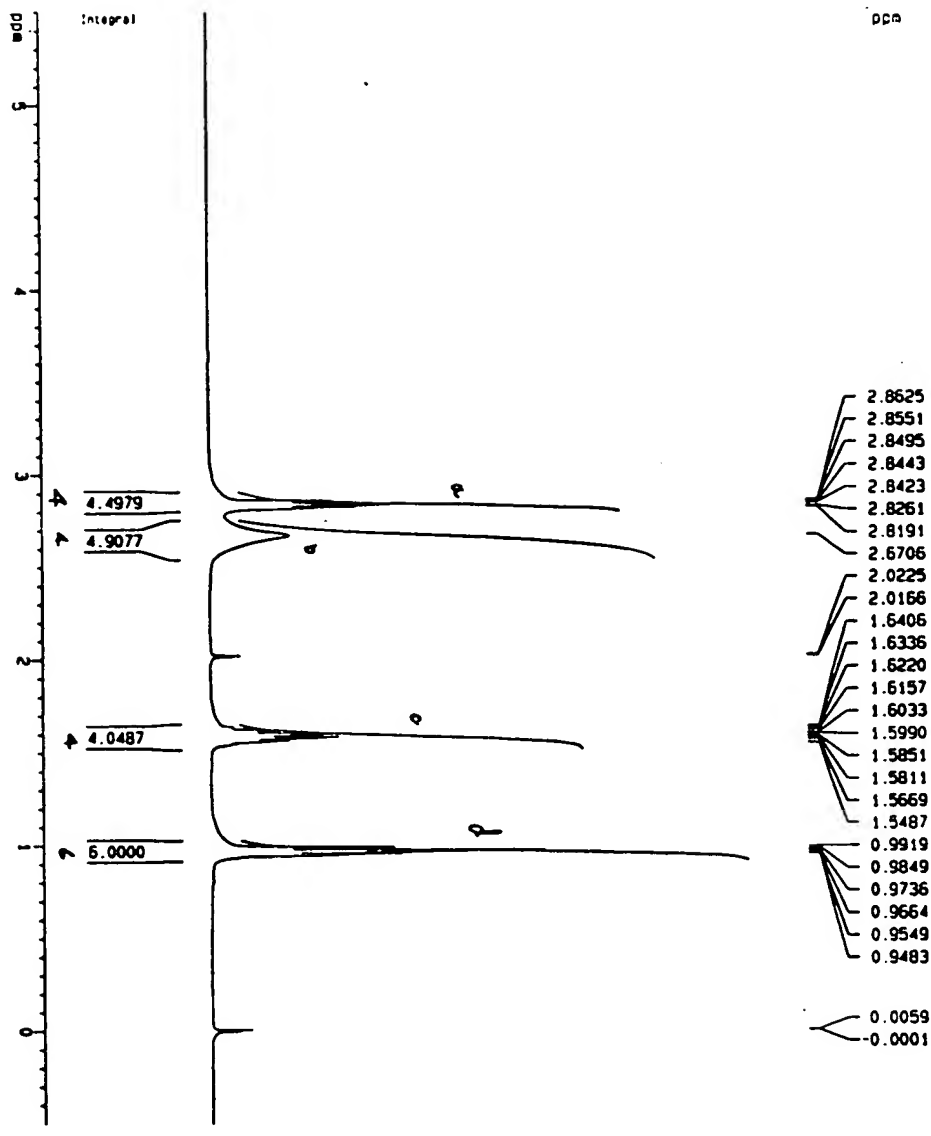
Figure 3S. Photograph picture showing phase separation of $\text{Ag}(\text{H}_2\text{N}-\text{C}_3\text{H}_7)_2^+ \text{Tl}_2\text{N}^-$ RTIL and water.

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after wash

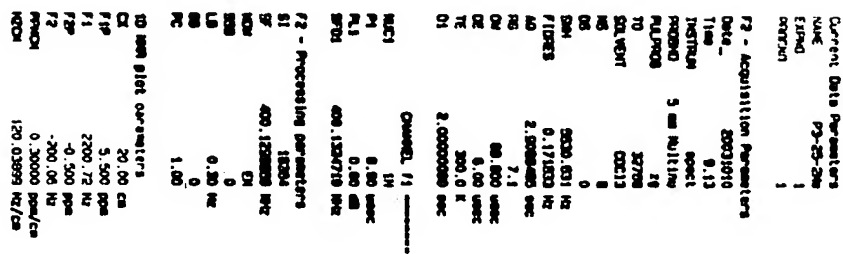


Current Data Parameters
 NAME P3-18-2
 EXPNO 1
 PROCNO 1
 F2 - Acquisition Parameters
 Date_ 20031006
 Time 12.46
 INSTRUM spect
 PROBRW 5 mm N/11nu
 PULPROG zg
 TD 32768
 SCALED 0
 NS 0
 DS 0
 SWH 9630.631 Hz
 FIDRES 0.171633 Hz
 AQ 2.9098485 sec
 RG 71.8
 DM 88.600 uspc
 DE 8.00 uspc
 TE 300.0 K
 01 2.00000000 sec

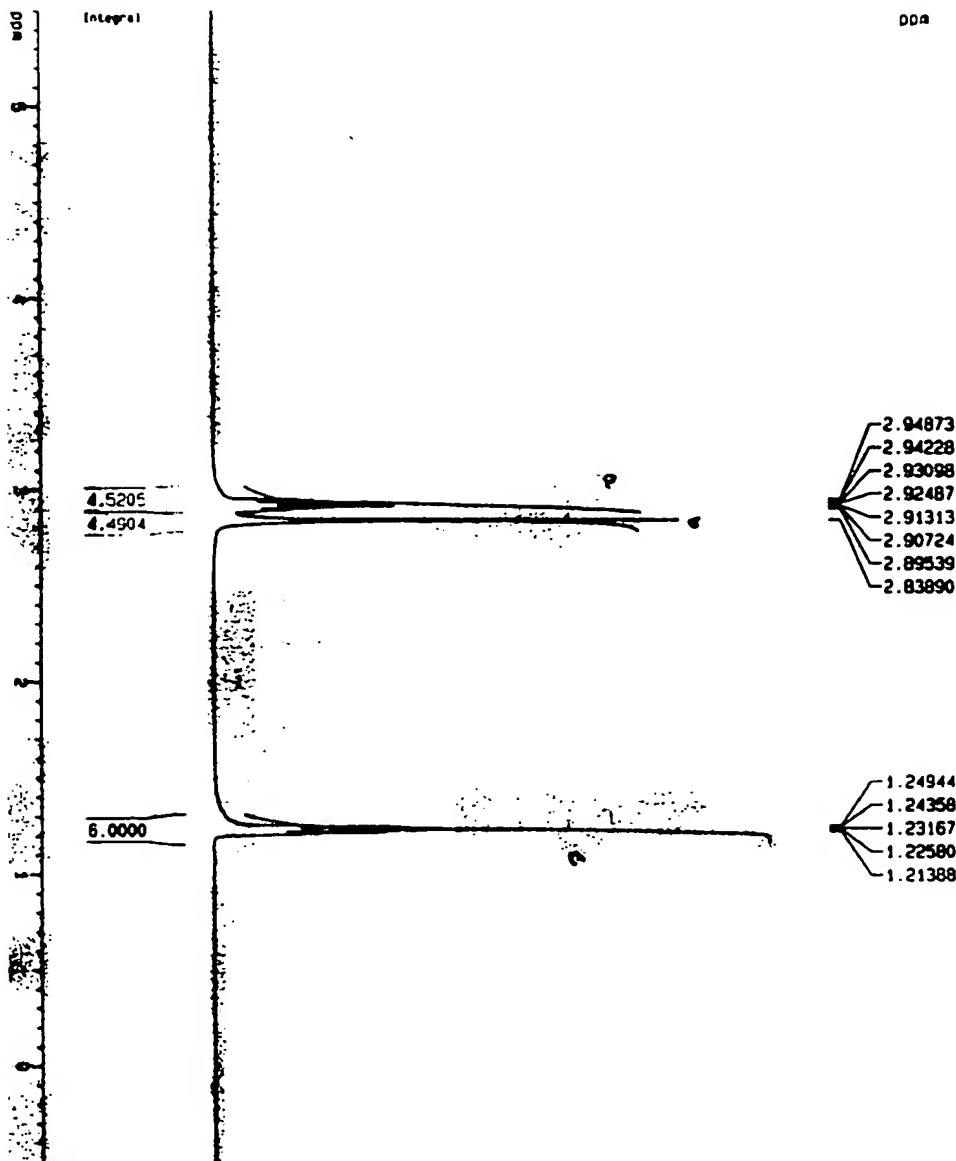
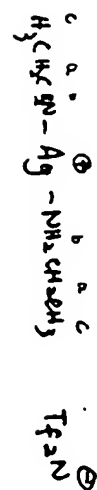
===== CHANNEL f1 =====
 NUC1 1H
 P1 6.00 uspc
 PL1 0.00 dB
 SFO1 400.1324710 MHz

F2 - Processing parameters
 SI 16384
 SF 400.130041 MHz
 WDW EM
 SSB 0
 LB 0.30 Hz
 GB 0
 PC 1.00

ID NMR plot parameters
 CX 20.00 cm
 C1 5.500 ppm
 F1 2200.72 Hz
 F2 -4.500 ppm
 F2 -200.16 Hz
 PPM0 0.30000 ppm/ci
 NUCM 120.03900 Hz/cm

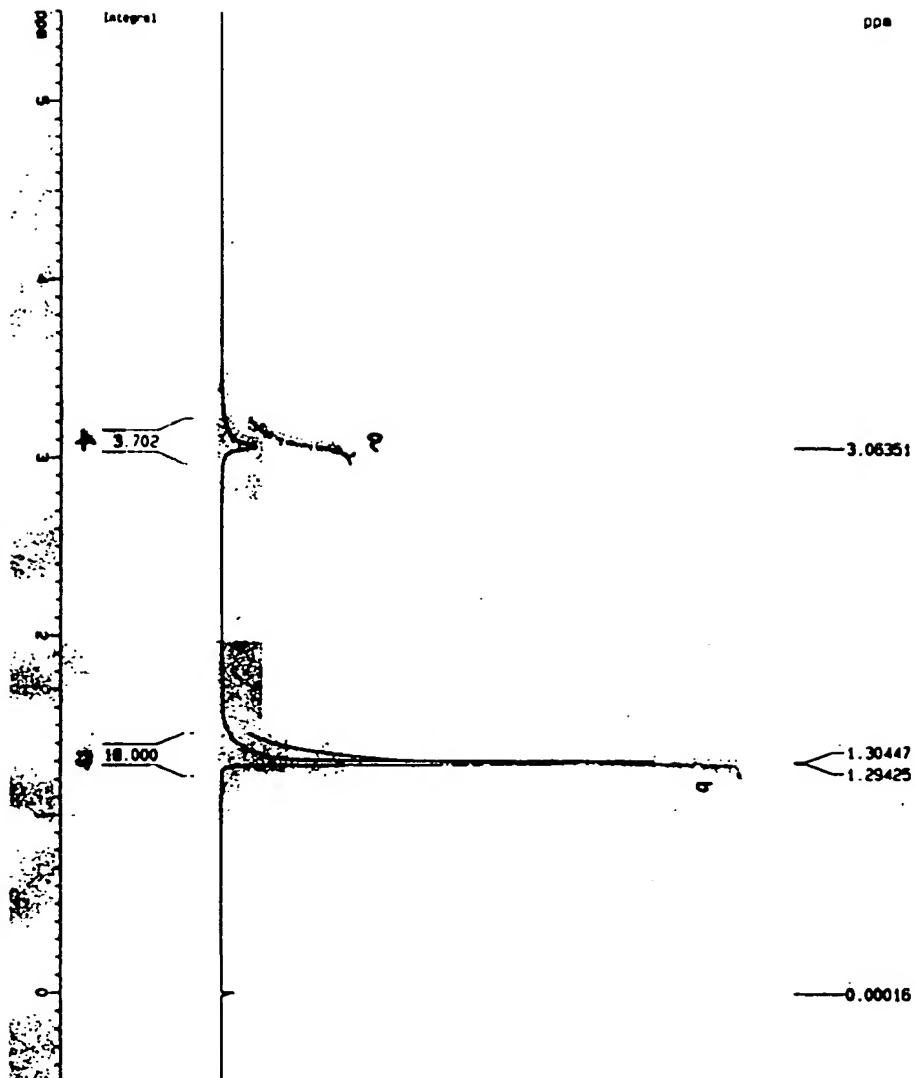
$$\text{CH}_3\text{N}^+\text{H}_2\text{Ag}-\text{NH}_2\text{CH}_3 \cdot \text{Tf}_2\text{N}^-$$


Figs 8



Current Data Parameters
 NAME P3-25-251
 EXPNO 1
 PROCNO 1
 F2 - Acquisition Parameters
 Date_ 20031010
 Time 9.08
 INSTRUM spect
 PROCNO 5 am nulling
 PULPROG zg
 TD 32768
 SFO 400.1254710 MHz
 SOLVENT CDCl3
 NS 8
 DS 0
 SWH 5630.831 Hz
 FIDRES 0.171833 Hz
 AQ 0.171833 Hz
 RG 2.928463 sec
 AD 14.3
 RF 99.800 MHz
 DE 8.00 MHz
 TE 300.0 K
 D1 2.0000000 sec
 Channel f1
 MLC1 1H
 P1 0.00 MHz
 PL1 0.00 dB
 SFO1 400.1254710 MHz
 F2 - Processing parameters
 SI 16384
 SF 400.1254710 MHz
 ICN 1H
 PC 0.30 Hz
 LB 0.30 Hz
 GB 0
 PC 1.00
 ID user plot parameters
 CX 20.00 cm
 F1P 5.500 ppm
 F1 2200.72 Hz
 F2P -4.500 ppm
 F2 -200.18 Hz
 PPM/Hz 0.30000 ppm/Hz
 HZ/Hz 120.03800 Hz/Hz

Fig 9



Current Data Parameters
 NAME: P2-22-1124
 EXPNO: 1
 PROCNO: 1
 F2 - Acquisition Parameters
 Date_: 20031009
 Time: 10:41
 INSTRUM: spect
 PROBRG: zgpg30
 PULPROG: zgpg30
 TD: 65536
 SOLVENT: CDCl3
 NS: 8
 DS: 4
 SWH: 5000.631 Hz
 FIDRES: 0.171620 Hz
 AQ: 2.500425 sec
 RG: 327.5
 DB: 0.000000
 DE: 0.000000
 TE: 300.2 K
 D1: 2.00000000 sec
 ===== DUMPI, f1 =====
 NAME: 1H
 P1: 0.80 sec
 PL1: 0.00 dB
 SFO1: 400.1364710 MHz
 F2 - Processing parameters
 SI: 32768
 SF: 400.1364710 MHz
 DS: 4
 SSF: 0
 LB: 0.30 Hz
 GB: 0
 PC: 1.00
 ID: 1000000000
 CI: 20.00 cm
 F1P: 5.500 MHz
 F2P: 2200.72 MHz
 F2Q: -0.500 MHz
 PPM0: 0.000000 MHz/cm
 NUC1: 120.000000 MHz/cm

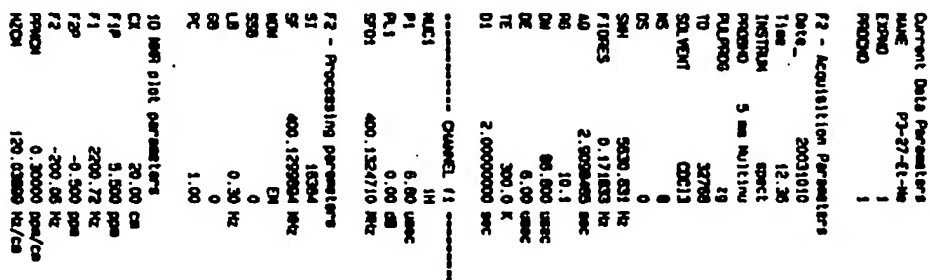
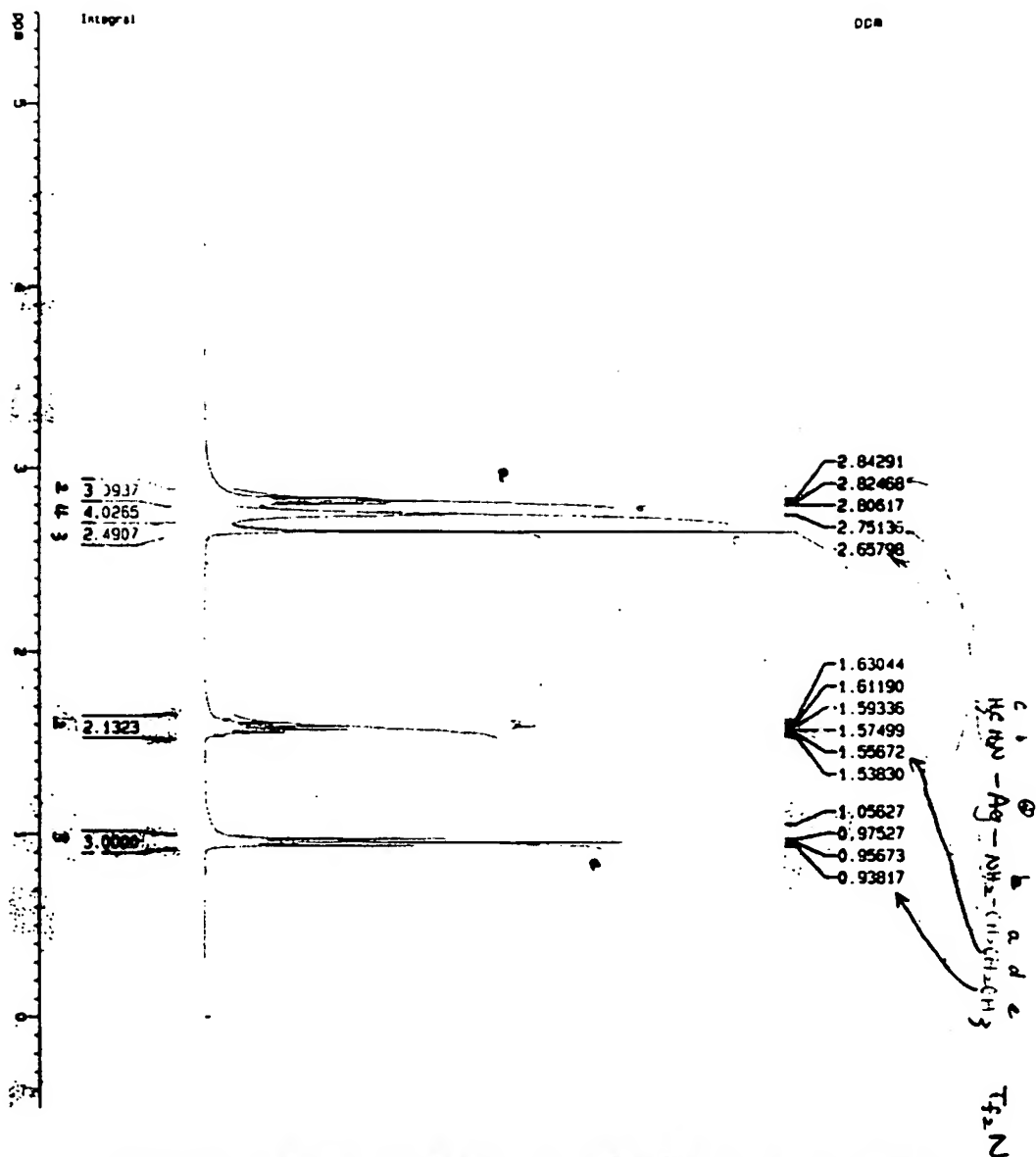
$$\begin{array}{c} \text{c} \quad \text{b} \quad \text{a} \quad \text{d} \\ \text{CH}_3\text{NH}_2 - \text{Ag} - \text{NH}_2\text{CH}_2\text{CH}_3 \end{array} \quad \text{Tf}_2\text{N}^{\ominus}$$


Fig 11



Current Data Parameters

NAME	72-26-01-10
EXPNO	1
PROCNO	1

F2 - Acquisition Parameters

Date_	20031010
Time	11.27
INSTRUM	spect
PROBHD	5 mm Bb1Hnu
PULPROG	zgpg30
TD	32768
SOLVENT	CDCl3
NS	8
DS	0
SWH	5630.631 Hz
FIDRES	0.171633 Hz
AQ	2.5929465 sec
RG	11.2
DS	88.000 usec
DE	6.00 usec
TE	300.0 K
01	2.00000000 sec

Channel f1

NUC1	1H
P1	6.00 usec
PL1	0.00 dB
PR1	400.126710 MHz

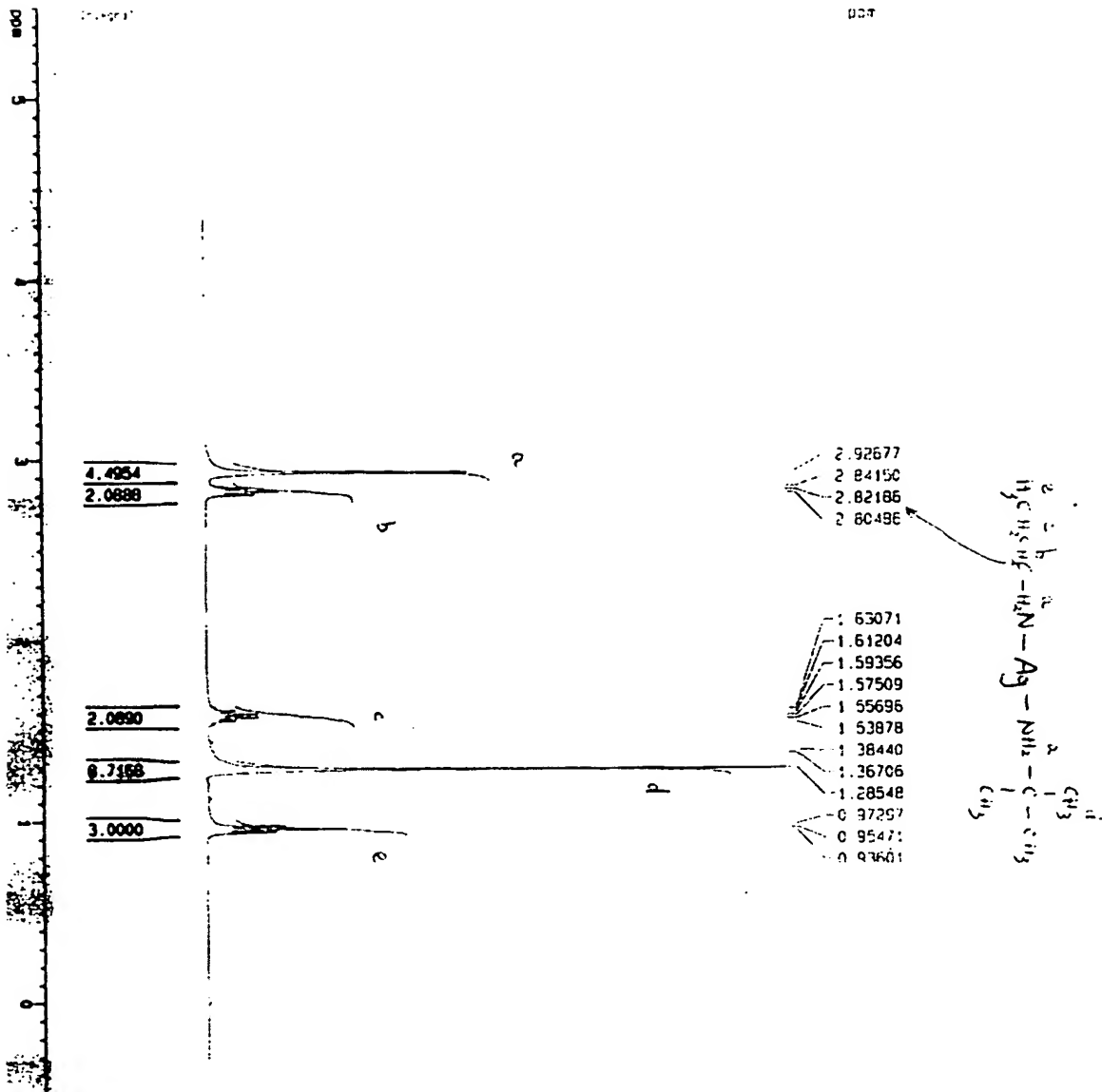
F2 - Processing parameters

SF	400.126710 MHz
WDW	EM
SSB	0
LB	0.30 Hz
GB	0
PC	1.00

10 MHz plot parameters

CF	20.00 cm
RF	5.300 ppm
F1	2200.72 Hz
F2	-0.300 ppm
PC	-200.06 Hz
PR	0.30000 ppm/cm
PC	120.03369 Hz/cm

Fig 12



Current Data Parameters

NAME: F3-24-18-7r

EXPNO: 1

PROCNO: 1

F2 - Acquisition Parameters

Date_: 20031010

Time: 9.18

INSTRUM: spect

PROBHD: 5 mm HLLHNP

PULPROG: zgpg30

TD: 32768

SOLVENT: CDCl3

NS: 0

DSH: 0

SWH: 2000.631 Hz

FIDRES: 0.171633 Hz

AQ: 2.5050463 sec

RG: 11.3

DE: 68.000 usec

OE: 6.00 usec

TE: 300.0 K

D1: 2.00000000 sec

===== CHANNEL f1 =====

NUC1: 1H

P1: 0.00 sec

PL1: 0.00 dB

SR01: 400.1264710 MHz

F2 - Processing parameters

SI: 32768

SF: 400.1264714 MHz

WDW: EM

SSB: 0

LB: 0.30 Hz

GB: 0

PC: 1.00

1D NMR plot parameters

CZ: 20.00 cm

FSF: 5.008 ppm

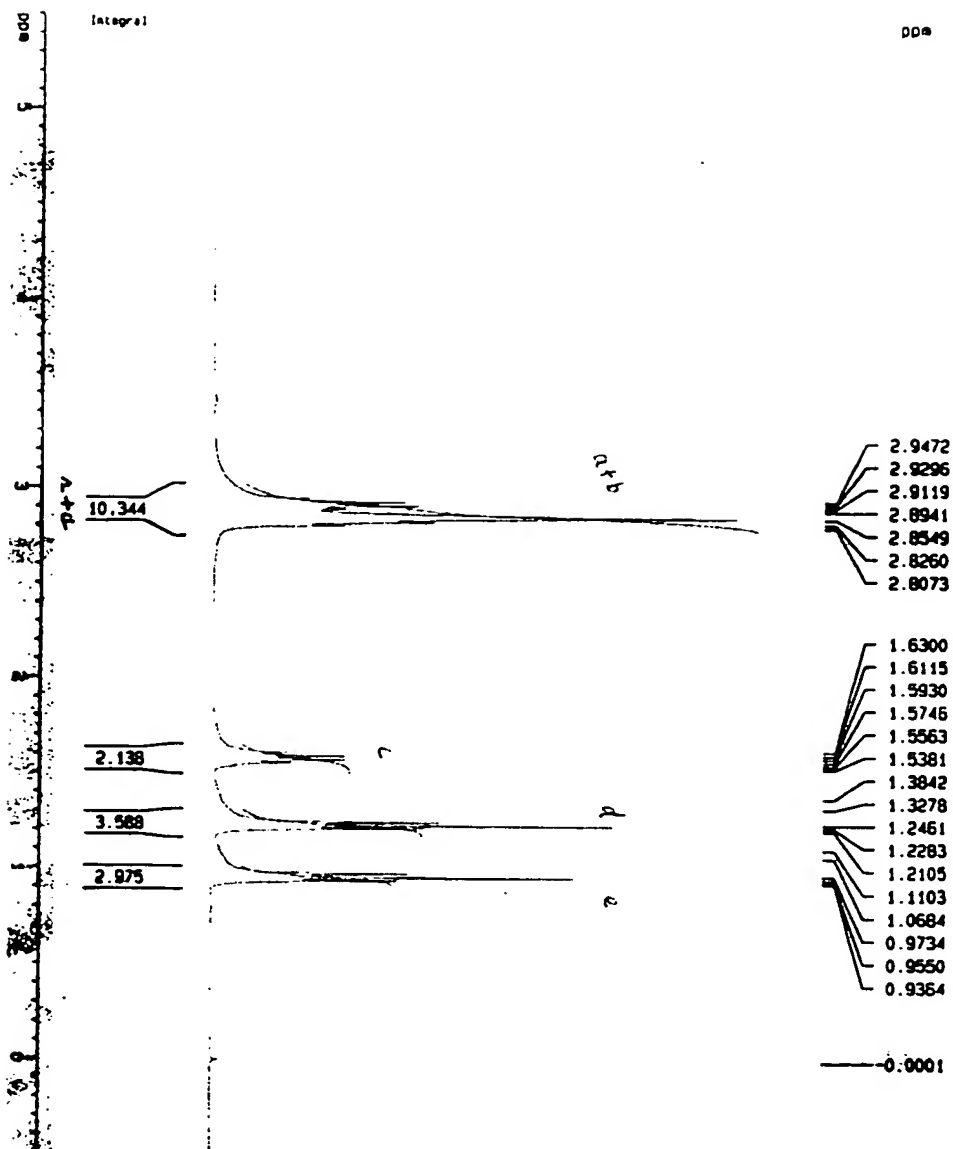
F1: 2200.72 Hz

F2P: -0.508 ppm

F2: -200.08 Hz

PRCQ1: 0.30000 ppm/cm

KCQ1: 120.03800 Hz/cm

$$\begin{array}{ccccccc} d & a & b & \oplus & b & a & e \\ H_3C & H_2C & NH_2 & - & Ag & - & NH_2CH_2CH_2CH_3 \cdot Tl_2N^{\oplus} \end{array}$$


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Current Data Parameters
NAME          P9-21-1720
EXPNO         1
PROCNO        1

F2 - Acquisition Parameters
Date_         20011005
Time          8.32
INSTRUM       spect
PROBHD        5 mm Nal/Hv
PULPROG       zgpg30
TD            16
SOLVENT       CDCl3
NS            8
DS            0
SWH           5000.631 Hz
FIDRES        0.173623 Hz
AQ            2.8054685 sec
RG            14.3
NA            60.000 usec
DE            6.00 usec
TE            300.0 K
D1            2.00000000 sec

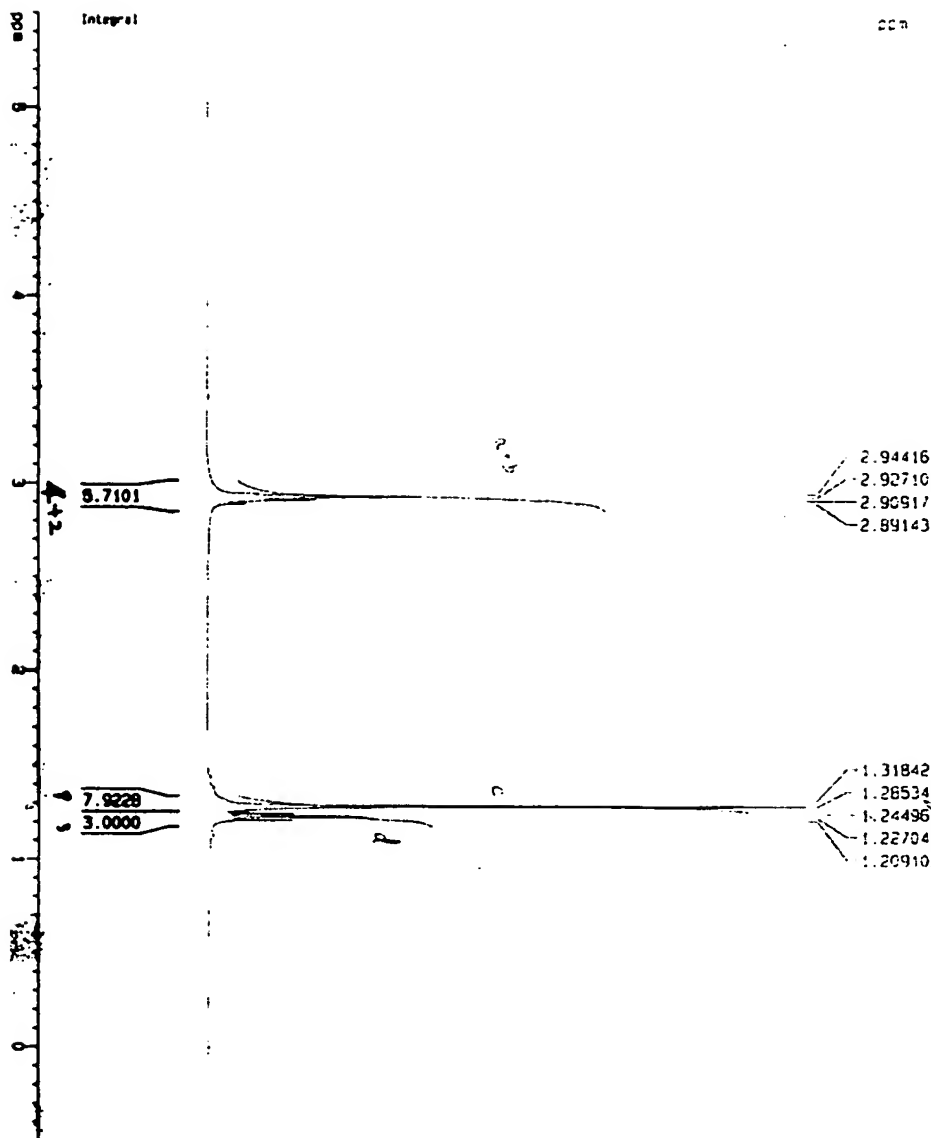
===== CHANNEL f1 =====
NUC1          1H
P1            12.00 usec
PL1           0.00 dB
SFO1          400.1324710 MHz

F3 - Processing parameters
SI            16384
SF            400.1326028 MHz
WDW           EM
SSB           0
GB            0
PC            1.00

10 user plot parameters
CX            20.00 cm
F1P           5.500 ppm
F1            2200.72 Hz
F2P           -0.500 ppm
F2            -300.06 Hz
PULPROG       zgpg30
PCPDCH        9.20000 usec/c
PCPDCH        120.03000 Hz/c

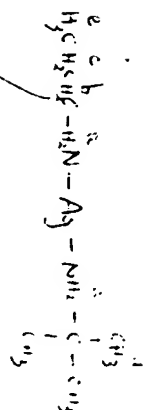
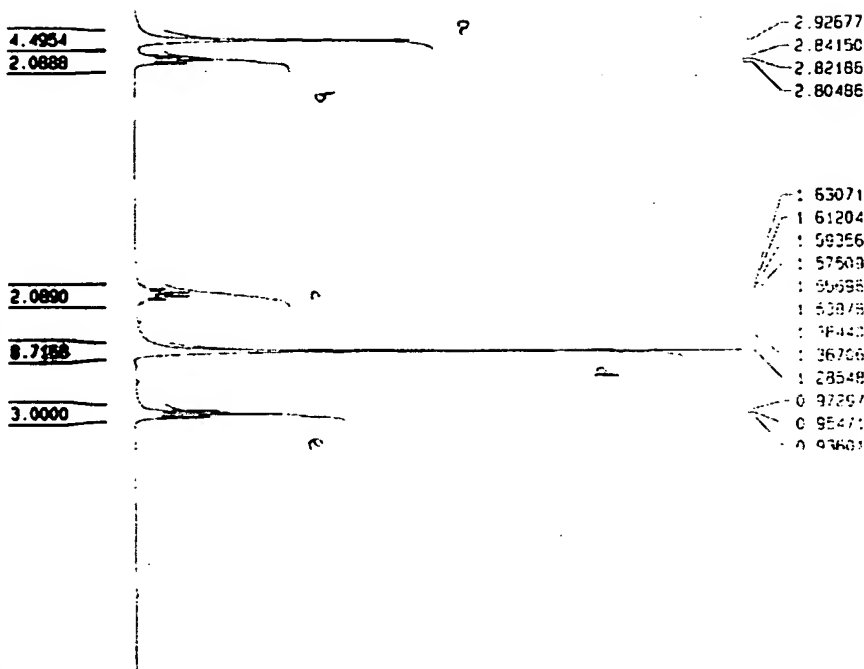
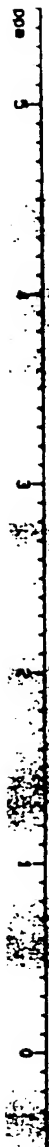
```

Fig 14



Current Data Parameters
 Name: P1-21-18-11
 EXPNO: 1
 PROCNO: 1
 F2 - Acquisition Parameters
 Date_: 2001010
 Time: 11:22
 INSTRUM: spect
 PULPROG: zgpg30
 ALPROG: zgpg30
 TO: 32768
 SOLVENT: DMSO
 NS: 8
 DS: 0
 SWH: 5020.831 Hz
 FIDRES: 0.171633 Hz
 AQ: 2.009440 sec
 RG: 11.3
 CH: 68.800 uMHC
 CE: 6.00 uMHC
 TE: 300.0 K
 O1: 2.00000000 sec
 ----- Channel f1 -----
 NUC1: 1H
 P1: 9.00 uMHC
 PL1: 0.00 dB
 SFO1: 400.1254710 MHz
 F2 - Processing parameters
 SI: 1024
 SF: 400.125587 MHz
 CH: 68.800 uMHC
 SSB: 0
 LB: 0.30 Hz
 GB: 0
 PC: 1.00
 ID: 1000 plot parameters
 CX: 20.00 cm
 F1P: 9.500 ppm
 F1: 8200.72 Hz
 F2P: -0.500 ppm
 F2: -200.00 Hz
 FREQ1: 0.30000 ppm/cm
 FREQ2: 120.00000 Hz/cm

03π



Current Data Parameters		F2 - Acquisition Parameters	
NAME	F3-24-18-0r	Date	20031010
EXPNO	1	Time	9.18
PROCNO	1	INSTRUM	spect
		PROBHD	5 mm Multiv
		PULPROG	zgpg30
		TD	32768
		SF	300.13
		WDW	EM
		SSB	0
		GB	0
		F2FREQ	0.171600 Hz
		RG	2.593485 sec
		DE	11.3
		TE	300.0 K
		DELTA	2.00000000 sec
		Channel 1	
		NAME	4M
		P1	0.00 sec
		P2	400.1324710 sec
		F2 - Processing parameters	
		SI	16384
		KHZ	400.1259514 MHz
		SSB	EM
		GB	0
		DE	0.30 Hz
		TE	0
		PC	1.00
		10 MHz plot parameters	
		CL	50.00 cm
		F1P	5.200 ppm
		F1	2200.72 Hz
		F2P	-0.560 ppm
		F2	-200.05 Hz
		PRCHN	0.30000 ppm/cm
		KHZ	120.05000 Hz/cm

Fig 16

C-13 NMR spectrum of $\text{Ag}(\text{H}_2\text{N}-\text{C}_3\text{H}_7)_2^+ \text{ Tf}_2\text{N}^-$ RTIL.

